Complete Summary

GUIDELINE TITLE

Chronic obstructive pulmonary disease (COPD).

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Chronic obstructive pulmonary disease (COPD). Helsinki, Finland: Duodecim Medical Publications Ltd.; 2002 Apr 27. Various p.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Chronic obstructive pulmonary disease (COPD)

GUIDELINE CATEGORY

Diagnosis
Management
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Pulmonary Medicine

INTENDED USERS

Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collects, summarizes, and updates the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

- Adults with chronic obstructive pulmonary disease (COPD)
- Adults requiring evaluation for possible chronic obstructive pulmonary disease

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Physical examination and assessment of signs and symptoms
2. Spirometry in combination with active promotion of smoking cessation
3. Test with a bronchodilating drug and subsequent assessment of response (as measured by spirometry and bronchodilator dose or peak expiratory flow [PEF] follow-up)
4. Evaluation of the effectiveness of anti-inflammatory treatment with a trial of steroids (oral prednisolone or inhaled steroid)
5. Assessment of diffusion capacity
6. Blood gas analysis
7. Chest radiograph

Treatment

1. Cessation of smoking
2. Drug therapy
    - Bronchodilating medication (Inhaled anticholinergic drug [ipratropium or oxytropium bromide]; Inhaled beta-sympathomimetic [salbutamol, terbutaline, fenoterol] possibly in combination with anticholinergic drug; oral, long-acting theophylline)
    - Anti-inflammatory medication (inhaled steroids for patients who objectively benefit from a trial of steroids)
3. Non-pharmacologic measures to promote mucous excretion (expiration resistance [positive expiratory pressure [PEP] mouthpiece] or blowing air through a straw into a bottle filled with water, combined with effective coughing)
4. Treatment of acute exacerbation with oxygen by nasal catheter or by venturi mask, an inhaled sympathomimetic (salbutamol or terbutaline) by a dosing device or a spray, possibly in combination with an inhaled ipratropium bromide, theophylline infusion if response to other treatments is poor, methyl prednisolone or oral corticosteroids (prednisolone)
5. Treatment of acute infection with antimicrobials (amoxicillin, doxycycline, sulpha-trimethoprim)
6. Exercise
7. Vaccinations (influenza, pneumococcal, haemophilus influenzae)
8. Oxygen therapy at home

Note: Guideline developers considered, but did not recommend the following interventions: nutritional support, cardioselective beta-blockers for short-term reduction in airway function, and vibration for clearing bronchial secretions.

MAJOR OUTCOMES CONSIDERED

- Symptom relief
- Exercise capacity
- Lung function (as measured by spirometry)
- Morbidity and mortality
- Quality of life
- Frequency and severity of exacerbations

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A: Strong research-based evidence. Several relevant, high-quality scientific studies with homogeneous results.

B: Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.

C: Limited research-based evidence. At least one adequate scientific study.

D: No scientific evidence. Expert panel evaluation of other information.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

Basic Rules

- Make early diagnosis by spirometry and promote smoking cessation.
- A trial of steroids must be performed if starting long-term steroid treatment is considered.

Definitions

- Chronic bronchitis: sputum at least for 3 months in 2 consecutive years.
- Pulmonary emphysema: terminal air spaces widen and alveolar walls rupture.
- Chronic obstructive pulmonary disease (COPD): the patient has chronic, progressive airway obstruction, with no significant response to treatment. The patient may simultaneously have chronic bronchitis and emphysema.

Aetiology

- Most COPD patients (>95%) are smokers. Half of those who smoke have symptoms of chronic bronchitis. In 15-20% of smokers a slowly aggravating airway obstruction is detected.
- Deficiency of alpha-1-antitrypsin is a rare cause of emphysema in young patients.

Symptoms

- Cough and sputum excretion are common symptoms of chronic bronchitis.
- All suffer from slowly increasing dyspnoea during exercise.
- The symptoms are aggravated by respiratory infection.

Signs

- Because of airway obstruction, wheezing rattles may be heard at the end of forced expiration.
- The patient with advanced emphysema has a barrel-chested appearance, in auscultation silent respiratory sounds are heard and in percussion the sound is hypersonor.
- Cyanosis is associated with hypoxaemia.

Complications

- Acute
    - Repeated and prolonged lower respiratory infections
    - Acute respiratory failure
    - Pneumothorax (disruption of emphysematic bullae)
- Chronic
    - Cardiopulmonary disease (McCrory & Brown, 2001)

Diagnosis

- Early diagnosis by spirometry in combination with active promotion of smoking cessation is essential.
- Test with a bronchodilating drug (Sestini & Ram, 2001)
    - The objective response to a bronchodilator (increase > 15%) is measured with spirometry and bronchodilator dose (e.g. inhaled salbutamol 200 micrograms twice daily), or peak expiratory flow rate (PEF) follow-up for two weeks.
- Evaluate the effectiveness of anti-inflammatory treatment with a trial of steroids.
    - Oral prednisolone, initially 30-40 mg/day (if necessary, some protection against ulcers, e.g. a proton pump inhibitor [PPI]), or inhaled steroid (e.g. budesonide 800 micrograms twice daily). In oral administration the trial duration is 2 weeks, with an inhaled steroid 6 weeks.
    - If there is an objective response peak expiratory flow rate or forced expiratory volume in one second (FEV_1) increase > 15% and at least

200 mL), continue with inhalation steroid (the patient may also have asthma).
- Diffusion capacity
  - Decreased in COPD, normal in asthma.
- Blood gas analysis
  - In late stages of COPD arterial blood oxygen partial pressure (pO_2) decreases and carbon dioxide partial pressure (pCO_2) may increase
- Chest radiograph is of limited value in COPD diagnosis

Treatment

Cessation of Smoking

- The most essential factor regarding the prognosis.
- Does not normalize lung function, but the progressive deterioration of FEV_1 slows down and proceeds at the same pace as in nonsmokers.
- According to present knowledge, there is no drug therapy available that could delay the deterioration of lung function if the patient continues smoking. Drugs act only by relieving subjective symptoms and in the treatment of acute exacerbations.

Basic Rules in Drug Therapy

- Mild disease (FEV_1 <80% of reference value)
  - Asymptomatic patients
    - No drug therapy
  - Symptomatic patients
    - Anticholinergics or short-acting beta-2-agonists according to clinical response
    - Trial of steroids if asthma is suspected
- Moderate disease (FEV_1 <65%)
  - Anticholinergics or short-acting beta-2-agonists (possibly combined) according to clinical response.
  - Trial of steroids if asthma is suspected
- Severe disease (FEV <45%)
  - Combination of anticholinergics and beta-2-agonists on a regular basis
  - Trial of steroids
  - Trial of long-acting beta-2-agonists
  - Trial of theophylline

Bronchodilating Medication

- Inhaled anticholinergic drug (ipratropium or oxytropium bromide) (McCrory & Brown, 2001) [C]
  - First line treatment
  - The dose must be high enough; administration 4-6 times daily.
- Inhaled beta-sympathomimetic (salbutamol, terbutaline, fenoterol) (Sestini & Ram, 2001) [A]
  - May be combined with an anticholinergic drug
  - Long-acting beta-sympathomimetics may improve quality of life and reduce symptoms (Appleton et al., 2001) [C].
- Oral, long-acting theophylline

- Adverse effects (central nervous system, gastrointestinal symptoms) are common (follow-up of serum concentrations is necessary!)
- Arrhythmias and convulsions are signs of toxicity.
- Keep in mind various interactions with other drugs (e.g. antibiotics)!

Anti-inflammatory Medication

- Inhaled steroids are only prescribed for patients who objectively benefit from a trial of steroids. The benefit in terms of lung function is very limited (van Grunsven et al., 1999; DARE, 2001) [B].

Treatment of Mucous Excretion

- If production of mucus is a problem, the patient may empty the lungs (Jones & Rowe, 2002) [C] at home
    - by using expiration resistance (positive expiratory pressure [PEP] mouthpiece) or blowing air through a straw into a bottle filled with water, combined with effective coughing
- Mucolytic agents should be used only temporarily (Poole & Black, 2001) [B].

Treatment of Acute Exacerbation

- Oxygen by nasal catheter or by venturi mask. Caution should be exercised when dosing (if the result of an arterial blood gas analysis is not available, the concentration of mask oxygen should not exceed 28%, or nasal catheter flow should not exceed more than 2L/min in patients above 50 years of age).
- An inhaled sympathomimetic (salbutamol 2.5-5 mg or terbutaline 5-10 mg) by a dosing device or a spray. It can be combined with an inhaled ipratropium bromide 0.5 mg.
- There is no evidence of a significant effect of theophylline infusion (Barr, Rowe, & Camargo, 2001) [C] but it can be used at a dose of 0.5 mg/kg/h if response to other treatments is poor. Serum theophylline concentration should be monitored if possible.
- Methyl prednisolone 0.5 mg/kg every 6 hours is probably beneficial. Also oral corticosteroids (prednisolone 30-40 mg/day) are used empirically for 7-14 days.

Acute Infection

- Antimicrobial treatment in exacerbation of COPD is controversial (McCrory & Brown, 2001) (Saint et al., 1995; DARE, 1999) [B]. Factors that indicate starting antimicrobial treatment include:
    - increased dyspnoea
    - increased sputum
    - purulent sputum.
- If the patient exhibits two of the three symptoms listed above, an antimicrobial drug is usually indicated (Saint et al., 1995; DARE, 1999) [B].
- Alternatives in antimicrobial treatment:
    - Amoxicillin 500 mg three times daily for 10 days
    - Doxycycline 150 mg once daily for 10 days
    - Sulpha-trimethoprim, dose of trimethoprim 160 mg twice daily for 10 days.

- Antibiotics do not belong to the basic maintenance therapy of COPD.

Improvement of Exercise Capacity

- Long-lasting, regular, and moderate exercise (Lacasse et al., 1996; DARE, 1999; Cambach et al., 1999; DARE, 2000) [A]

Vaccinations

- Influenza vaccination to all patients with clearly decreased ventilatory function (Poole et al., 2001) [C].
- Pneumococcal vaccination is recommended.
- Haemophilus influenzae vaccination may also be beneficial (Foxwell & Cripps, 2001) [B].

Oxygen Therapy at Home

Basics

- Oxygen therapy at home can be used to prevent elevation of pulmonary arterial pressure in advanced COPD and to extend the survival of the patient.
- The effect of oxygen therapy on symptoms (e.g. shortness of breath) is quite limited.
- Oxygen therapy at home is meant only for patients with chronic hypoxaemia, i.e. arterial desaturation.
- Treatment decisions should be made after critical consideration.
- When initiating oxygen therapy at home, appropriate monitoring of treatment must be ensured. Treatment decisions and implementation of treatment are best left to a local pulmonary clinic to be taken care of.

Initiation Criteria for Oxygen Therapy

- Chronic, advanced pulmonary disease (FEV_1 <1.5 L)
- The partial pressure of oxygen in arterial blood, with the patient in stabile stage breathing room air, in two samples taken with an interval of at least three weeks <7.3 kPa.
- Partial pressure of oxygen can also be 7.3-8.0 kPa if one of the following criteria is involved:
    - signs of increased pulmonary arterial pressure (e.g. oedema)
    - secondary polycythaemia (crit >55)
    - significant nocturnal hypoxaemia established by oximetry and reversible by oxygen therapy and not caused by concomitant sleep apnoea syndrome
    - significant neuropsychological symptoms reversible by oxygen therapy.
- Oxygen therapy enables a desired response (PaO_2 >8.0 kPa) without unfavourable increase in partial pressure of carbon dioxide in arterial blood.
- The patient does not smoke and is co-operative enough.

Implementation of Treatment

- Oxygen therapy at home is currently usually implemented using an electric oxygen concentrator. The oxygen concentrator eliminates nitrogen from room air and provides the patient with over 90%-proof oxygen. Compressed tanks can still be used in places with no electricity.
- Portable liquid oxygen is suitable for a small group of patients. Primarily these are patients who are still working or who for some other reason have special needs for mobility.
- All oxygen therapy necessitates good co-operation by the patient and willingness for long-term co-operation with the treating unit.
- Home calls made by a rehabilitation instructor are an essential part of the monitoring of patients receiving oxygen therapy at home.

Related Evidence

- There is little evidence on the effectiveness of ambulatory domicilary oxygen therapy on exercise capacity in patients with COPD (Ram & Wedzicha, 2002) [C].
- Noninvasive ventilation reduces mortality and need for intubation in severe exacerbations of COPD (Keenan & Brake, 1998; DARE, 2000) [A].
- In patients with stable COPD, pressurized metered-dose inhalers (pMDIs) produce similar outcomes to dry powder devices for delivering beta-2 agonist (Ram et al., 2002) [C].
- Nutritional support has no significant effect on anthropometric measures, lung function or exercise capacity in patients with stable COPD (Ferreira et al., 2001) [B].
- Cardioselective beta-blockers do not produce significant short-term reduction in airway function when given to patients with COPD (Salpeter et al., 2002) [B].
- There is no clear evidence supporting vibration for clearing bronchial secretions (Thomas et al., 1995; DARE, 1999) [D].
- Stapling is more effective than laser resection for lung volume reduction in diffuse emphysema, but there is no evidence from randomised trials comparing surgery with optimal conservative treatment (Hensley, Coughlan, & Gibson, 2001) [B].

Definitions:

Levels of Evidence

A: Strong research-based evidence. Several relevant, high-quality scientific studies with homogeneous results.

B: Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.

C: Limited research-based evidence. At least one adequate scientific study.

D: No scientific evidence. Expert panel evaluation of other information.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate management and treatment of chronic obstructive pulmonary disease (COPD) may help relieve patient symptoms, improve exercise capacity, improve lung function, reduce morbidity and mortality, improve quality of life, and reduce frequency and severity of exacerbations.

POTENTIAL HARMS

Adverse Effects of Medications

Common adverse effects of oral, long-acting theophylline include central nervous system and gastrointestinal symptoms. Arrhythmias and convulsions are signs of toxicity.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Chronic obstructive pulmonary disease (COPD). Helsinki, Finland: Duodecim Medical Publications Ltd.; 2002 Apr 27. Various p.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

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2002 Apr 27

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

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GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Authors: Editors

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: The following formats are available:

- HTML
- Portable Document Format (PDF)
- ASCII Text

This guideline is also included in a CDROM titled "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

- EBM guidelines. Evidence-based medicine. Helsinki, Finland: Duodecim Medical Publications, Ltd. 2002. [CDROM]
- EBM guidelines. Web site: www.ebm-guidelines.com.

Available from: Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 17, 2002. The information was verified by the guideline developer as of February 7, 2003.

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